

U.S. Department of Labor • Occupational Safety and Health Administration  
Saint Louis Area Office Area Office  
1222 Spruce Street  
Room 9.104  
Saint Louis, MO 63103  
Phone: (314) 425-4249 Fax: (314) 425-4289  
<http://www.osha.gov>



April 20, 2016

Tonya Howell  
11201 Renner Blvd.  
Lenexa, KS 66219

RE: OSHA Complaint No. 1069177

Dear Tonya Howell:

In response to your formal complaint concerning safety and/or health hazards at Meramec Caverns, the Occupational Safety and Health Administration conducted an inspection there. That inspection was completed on 4-11-16. The results of our investigation of your complaint items are as follows:

**Complaint item(s):**

Employee exposure to trichloroethylene (TCE).

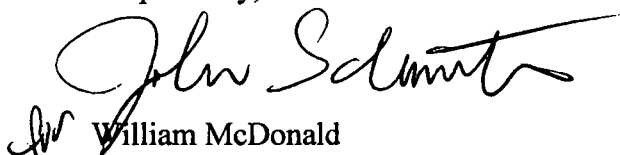
**Inspection finding(s):**

Full shift, personal and area sampling was conducted that resulting in exposure below, or non-detectable, the OSHA exposure limit. A summary of the sampling results are enclosed. No citation was issued to the company.

Section 11(c) of the OSH Act provides protection for employees against discrimination because of their involvement in protected safety and health related activity. If you believe you are being treated differently or action is being taken against you because of your safety or health activity, you may file a complaint with OSHA. You should file this complaint as soon as possible, since OSHA normally can accept only those complaints filed within 30 days of the alleged discriminatory action.

Thank you for your concern for a safe and healthful workplace.

Respectfully,

  
William McDonald  
Area Director

Enclosure(s)

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40507677



Superfund

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4/20/16

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March 21, 2016

Air monitoring was conducted at Meramec Cavern, Sullivan, MO on 3-9-16 for trichloroethylene. Tour Guides were monitored for occupational exposure, and "area" sampling was conducted at three locations within the cave tour route and one in the gift shop. Four SKC low flow sampling pumps were used for the personal (tour guide) sampling, and four MSA high flow pumps for the area sampling. Standard activated charcoal tubes were the sampling media, with the low flow pump flow rate set at approximately 0.05 liters per minute (LPM), and the high flow pumps at approximately 0.6 LPM. The results were calculated using the exact flow rate and adjusted for time weighted average (TWA) of eight hours for comparison to the OSHA permissible exposure limit (PEL) of 100 ppm. Because NIOSH considers trichloroethylene to be a potential carcinogen their recommended exposure limit (REL) was reduced to 25 ppm (as a 10 hour TWA). Pumps were pre and post calibrated.

All results for tour guides were 0.00000 ppm, with the reporting limit at 7.4 micrograms/sample. On 3-9-16 the guides provided two or three tours, which was a typical day. One personal pump stopped working, therefore results were less than a full shift (approximately eight hours/480 min). An approximate exposure was calculated from the area sampling results based on the fraction of employee exposure at the area where the high flow sampling pump was placed. (The Jungle Room tour guide exposure for a typical day was calculated at 20 minutes/day, and the Loot Rock exposure was calculated at 60 minutes/day. Extended time for the Loot Rock exposure considered exposure from the time the tour guide first entered Loot Rock until the tour returned to that point. These times were determined by interview of the tour guides.)

<u>POSITION</u>	<u>TIME (min)</u>	<u>RESULTS (ppm)</u>	<u>PEL (ppm)</u>	<u>REL (ppm)</u>
Tour Guide #1	465	0.00000	100	25
Tour Guide #2	418	0.00000	100	25
Tour Guide #3	427	0.00000	100	25
Tour Guide #4 *	197	0.00000	100	25
Area (Gift Shop)	473	0.00000	100	25
Area (At 1 <sup>st</sup> Airlock Door)	470	0.00000	100	25
Area (Loot Rock, After Airlock)	467	0.025	100	25
Area (Jungle Room)	469	0.040	100	25

Estimated tour guide exposure based on Loot Rock area sample was 0.0031 ppm.

Estimated tour guide exposure based on the Jungle Room area sample was 0.0017 ppm.

There was no violation of the OSHA exposure limit. Results also showed that the NIOSH REL was not exceeded.